Cam Clamp

The cam clamp you see here isn't new. In fact, I've admired the simple design for years. The big advantages of this design is that it's lightweight and doesn't apply a lot of pressure. That sounds like the exact opposite of the qualities of a good clamp, I know. However, for some tasks, like assembling small boxes, too much pressure (and a heavy clamp) can distort the project parts.

The clamp consists of two jaws and an aluminum bar, as shown in Figure 1. One jaw is fixed to the end of the bar, and the other slides along the bar to match the size of the workpiece. A cam lever in the adjustable jaw pivots against a flexible tongue to apply the clamping pressure.

The sliding jaw captures the aluminum bar between a pair of pins. To move it, you cock the jaw slightly to release it and slide it along the bar. The jaw wedges itself in place when clamping pressure is applied.

Fixed Jaw. Both jaws are fairly small. So it's a good idea to work with oversize blanks for the initial steps. I started by making the much simpler fixed jaw. You can use the patterns at right to guide you through the steps.

The first thing to do is cut a slot across the back edge (Figure 1c). The width of the slot is sized to accept the aluminum bar.

From there, you can create the notch on the inside edge, as shown in the pattern. Use a Forstner bit in the drill press to make the curved corners then remove the waste at the band saw.

Sliding Jaw. The sliding jaw has a few other details that deserve some mention. The first of these is a stopped slot that creates a pocket for the cam lever. I made this cut at the table saw with a dado blade. Turn to page 27 to see the setup I used.

Another detail to note is the slot for the clamp bar along the back of the jaw. It's deeper than the slot in the fixed jaw to account for aluminum pins that trap the bar. The space between them matches the width of the bar.

The final unique detail is the narrow kerf that allows the clamp pad to flex as pressure from the lever is applied. I drilled a stop hole at the end of the slot. The narrow kerf can be cut over at the band saw.

The final piece to make is the cam lever. I cut it to match the width of the stopped slot, then cut it to shape at the band saw.

Making Multiples. Chances are you'll want several of these clamps in your shop. So I've come up with some simple tips for making multiples. Shop Short Cuts on page 27 has the details.

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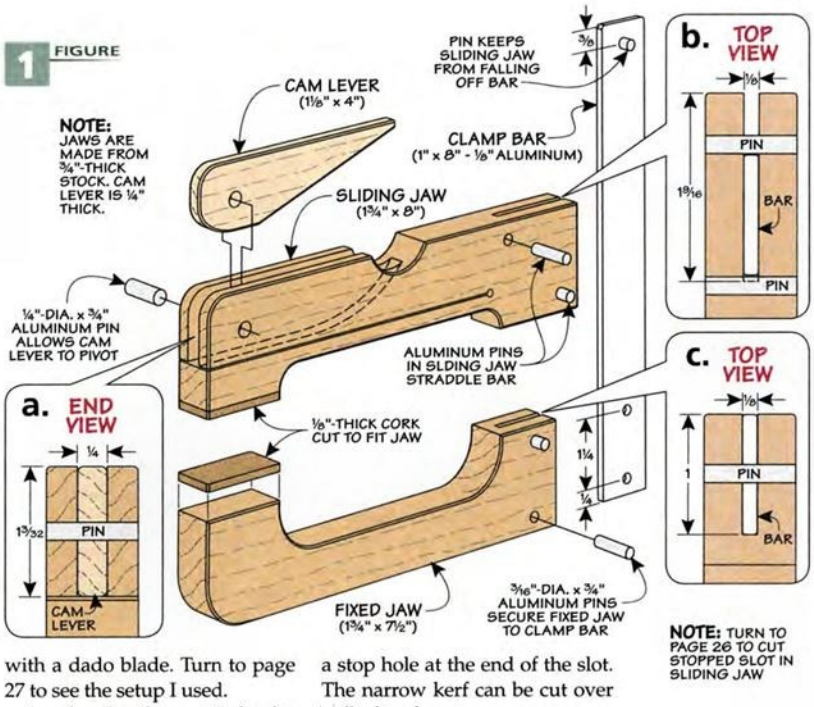
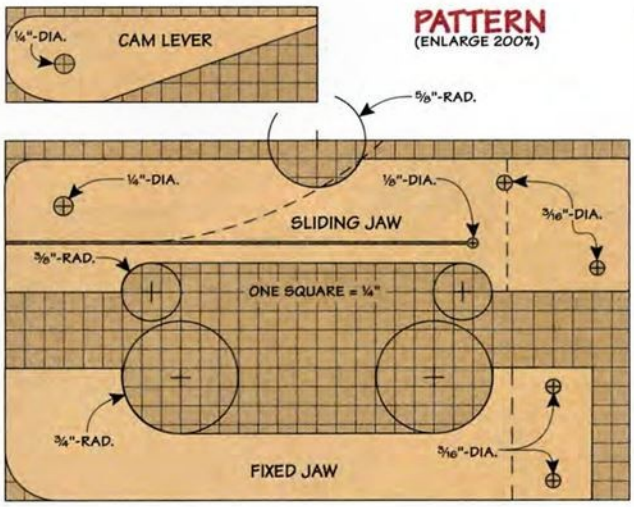




Making Multiple Clamps

The article on page 15 offers a good rundown on the steps to make a cam clamp. But you're sure to find this clamp so handy you'll want a whole set. I've come up with a few tips to streamline the process so that you can make two clamps or ten without investing a lot of extra time.

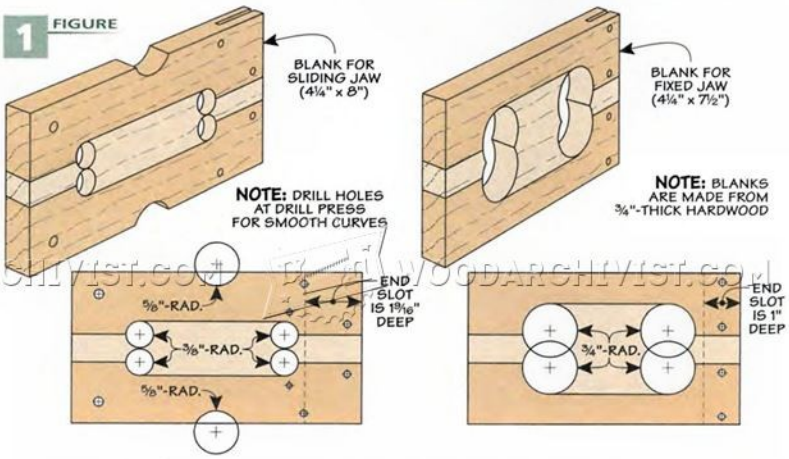
The key is using oversize blanks to get two identical parts from the same blank. This way, you can set up a tool for a specific step and perform multiple operations in short order.

The Blank. It all starts with the blank. I sized blanks to create pairs of each jaw — fixed and sliding, as illustrated in Figure 1. Size the blanks extra wide but match the length and thickness of the jaw components.

The key is the amount of waste between each part. You want to leave enough material here to keep the bit from wandering or grabbing the workpiece as you drill to create the radii on the inside edge of each jaw.

Before drilling, cut the slot for the clamp bar in each set of blanks. Be sure to note that the depth is different for each size.

Stopped Groove. Once the drilling is complete, the next step is cutting the stopped groove in the sliding jaw. You can see the setup I used for this cut in Figure 2. Start by installing a ¼" dado blade. Then make some test cuts to center the blade on the thickness of the blank. Clamp a hardboard stop to the rip fence at the location shown in Figure 2. This guarantees that each slot is the same length.



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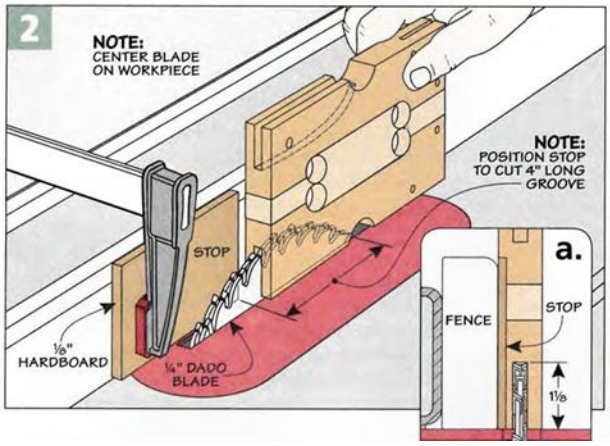
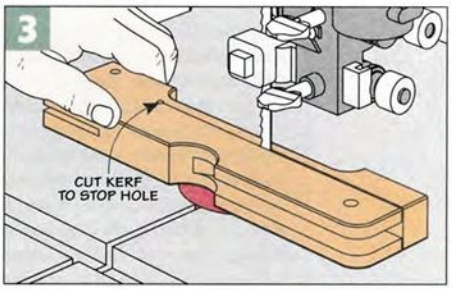
To make the cut, simply push the blank until it contacts the stop. Then turn off the saw and wait for the blade to stop before removing the workpiece.

Next I ripped the jaw blanks to final width and cut the profile at the band saw. You can also cut the kerf at the band saw, as illustrated in Figure 3.